




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

DE- 9J

MEMORANDUM

DATE: March 1, 2004

SUBJECT: USS Lead Refinery, Inc., U.S. EPA ID No. IND 047 030 226

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The document entitled "USS Lead - MRFI Addendum Off-Site Sampling and Analysis Report", dated October 15, 2001, is not considered an approved document. The information from this document has been replaced by the following more recently approved submittal:

"Final USS Lead Modified RCRA Facility Investigation (MRFI) Report"
March 1, 2004

The above replacement applies with the exception of Attachment 1, Laboratory Data Sheets, from "USS Lead - MRFI Addendum Off-Site Sampling and Analysis Report".

**USS LEAD - MRFI Addendum
OFF-SITE SAMPLING AND ANALYSIS
REPORT**

October 15, 2001

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1.0 INTRODUCTION

This MRFI Report Addendum - Off-Site Sampling and Analysis Report ("Off-Site Report") is submitted by Geochemical Solutions L.L.C. (Geochemical Solutions), on behalf of USS Lead Refinery, Inc. (USS Lead) to US Environmental Protection Agency (US EPA) and Indiana Department of Environmental Management (IDEM) in response to comments from US EPA in a letter dated March 14, 2001. In the March 14, 2001 letter, US EPA required that USS Lead conduct additional off-site soil sampling to determine the nature and extent of windborne contamination from the USS Lead facility following review of the Draft Modified Resource Conservation and Recovery Act (RCRA) Facility Investigation (MRFI) Report, submitted to US EPA by Law Engineering and Environmental Services, Inc. (LAW) on December 29, 2000.

This Off-Site Report describes the sampling activities and reports all the soil data collected during the off-site investigation. Data was collected according to the MRFI Work Plan Addendum, dated April 10, 2001 and approved by US EPA on May 30, 2001.

1.1 Purpose

The purpose of this report is:

- to describe activities used to determine the nature and extent of off-site windborne contamination originating from the USS Lead site, including collecting, handling and analyzing representative off-site surface soil samples, and
- to report all of the soil data collected under the MRFI Work Plan Addendum.

1.2 Objectives

The project objective was to determine the nature and extent of off-site windborne contamination originating from the USS Lead site.

2.0 FIELD ACTIVITIES

DAI Environmental and USS Lead collected initial laboratory samples on May 3, 2001. These samples were sent to the US EPA approved ACZ Laboratories, Inc (ACZ), in Steamboat Springs, Colorado to be used as field calibration samples for the field X-Ray Florescence spectrophotometer (XRF). Once laboratory results were received, additional field activities were conducted on June 5-8, 2001 by Geochemical Solutions and DAI Environmental with oversight by US EPA's contractor TechLaw. Sampling and analysis procedures were conducted according to the approved MRFI Work Plan Addendum, dated April 10, 2001. A summary of the sampling locations, sample identification, sample collection, sample handling, documentation and sample analysis are described below.

2.1 Sample Locations and Identification

XRF screening was performed on site for a total of forty-seven surface soil samples and twenty-two depth profile samples. Sixteen additional cluster samples were collected to determine if stop criteria had been met. Seventeen samples were collected for laboratory analysis, choosing samples of interest such as a sample below residential standards or an increasing trend from another source.

The laboratory analyzed both a total soil sample and a fine fraction sample as described in the section *Laboratory Analysis*, below.

2.1.1 Sample Locations

Transects. Sample locations were discussed in an onsite meeting between US EPA, USS Lead, TechLaw, and Geochemical Solutions on April 20, 2001. Actual sample locations were surveyed by GLE and Associates and are illustrated on Figure 1. In general, 4 transects moving away from the site and one transect along the eastern boundary were used. In addition, four (4) perpendicular transects were used to better define the lateral extent of contamination away from the transects.

Dominant Wind Direction. Sampling was performed downgradient from the site, taking into account the dominant wind direction. The dominant wind direction was determined using data from the Gary airport and comparing that data with the data from the South Bend, Indiana. The dominant wind direction appears to be from the west-southwest.

Sampling Interval and "Stop" Criteria for lateral and vertical extent of contamination. According to the approved MRFI Work plan addendum sampling continued, proceeding away from the site along the transects and perpendiculars until a soil lead concentration was measured below 400 mg/kg lead (Tier 1 residential soil standards and Region 9 PRGs for residential soil) or a soil lead concentration increased, indicating another potential source. US EPA was consulted many times during the sampling event and US EPA inspected the sampling locations and XRF results on June 7 and 8, 2001, during the sampling event. The continuation of sampling was confirmed with US EPA and additional sampling was performed on June 7 and 8, 2001 at US EPA's guidance.

When a "stop" as described above was reached, a cluster of three (3) samples (including the one "stop" criteria sample) was collected and analyzed with the field portable XRF to ensure that the criteria were met. Sampling continued when the average lead concentration for the cluster samples did not confirm that the "stop" criteria had been met.

Depth. Vertical profiling was performed at six (6) sample locations. Vertical profiling was used to determine the nature and vertical extent of contamination from migration of windborne contamination from the USS Lead site. Samples were collected at 6" intervals until one of the "stop" criteria was reached or when refusal of the hand auger was reached.

2.1.2 Sample Identification

The following sample identification was used:

- Transects. Five (5) transects were used. All Transects are illustrated on Figure 1. Transect 1 and Transect 2 are located north of the USS Lead site. Transect 3 and Transect 5 are located to the northeast of the site and Transect 4 is located along the eastern boundary of the site. Sample numbers will be designated using the T for transect, the transect number, and then sequential numbering away from the site. T5 is believed to be along the dominant wind direction, to the northeast. The final transect, Transect 4 (T4), projected from T3 along the eastern boundary of the site.
- Sample Numbers. Samples were labeled with sequential numbering moving away from the USS Lead site (T1-1, T1-2, etc). All of the samples on T4 were approximately equidistant from the USS Lead site, therefore sequential numbering began at the sample closest to T3 and increased in the southerly direction.

- **Perpendiculars.** Perpendicular transects were numbered away from the original transect (such as T3 or T4) and with the direction (north/south or east/west), for example, P1-N1, P1-S1, P2-N1, P2-S1, P3-E1, etc. Three perpendiculars from T4 were toward the east only.
- **Depth.** Six depth profile samples were collected from varying depths. Samples were identified for depth with sequential letters as depth increases. For example, a sample taken from 0-6" was designated T4-2A, 6"-12" was designated as T4-2B, etc.
- **Laboratory Sample Designation.** Samples sent to the laboratory were labeled with an "L" at the end of the sample designation (T1-2L).

2.2 Sample Procedure

Field soil screening using a portable XRF and confirmatory lead surface soil samples were collected to determine the nature and extent of off-site contamination, originating from the USS Lead site.

The two transects to the north of the USS Lead site (T1 and T2) were sampled and analyzed by ACZ Laboratories, an approved EPA Laboratory, in advance of field XRF work. Five (5) sample locations and two duplicate samples were collected according to the approved MRFI work plan addendum. In summary, the sampling procedure was as follows:

- surface soil samples were collected from zero (0) to six (6) inches below ground surface (bgs), using a decontaminated stainless steel spoon and bowl,
- the stainless steel spoon was used to removed the soil and placed the soil into a decontaminated stainless steel bowl which was sitting on a clean piece of disposable plastic sheeting,
- the soil was placed in a stainless steel bowl and homogenized,
- the samples were homogenized with a stainless steel spoon,
- initial samples were split into 3 appropriate laboratory certified glass sample container. One sample jar was kept on-site and analyzed using the field XRF at the start of the field work. Two jars were sent to ACZ Laboratories for: 1) total lead concentrations in the total soil, and 2) total lead concentration in fine soil fraction. Subsequent field work used only one laboratory certified glass sample container.
- During the XRF field program, samples were analyzed by the field portable XRF in the on-site trailer, and
- laboratory samples were placed in a cooler and kept at less than 4°C and sent to ACZ for analysis.

At soil boring locations, a surface soil sample was collected, and then sub-surface soil samples were collected by repeating the steps above at 6" intervals.

Samples were prepared in the laboratory according to the approved MRFI Work Plan Addendum and in general accordance with US EPA Guidance Document *TRW Recommendations for Sampling and Analysis of Soil at Lead (Pb) Sites* (EPA-540-F-00-010, OSWER 9285.7-38, April 2000).

During the XRF field program, samples were screened with the portable XRF for lead. XRF screening began with the five (5) samples stored on-site, splits of the samples collected from T1 and T2 and analyzed by ACZ Laboratories. The results of the XRF comparison are discussed below.

To begin field work, five new samples were collected adjacent to the T1 and T2 sample locations to determine if soil moisture had an effect on XRF lead concentrations. Relative Percent Differences (RPD) were calculated to determine a concentration factor to be applied to field XRF measurements and is described in the section below.

Surface soil samples were collected utilizing a decontaminated stainless steel spoon and a decontaminated stainless steel bowl as described above. At six sample locations, USS Lead continue sampling using a decontaminated stainless steel hand auger at 6" intervals to establish the depth of windborne contaminant migration.

2.3 Sample Handling and Documentation

Samples were handled and documented according to the approved *MRFI Work Plan* (September 17, 1997) and in accordance with the approved *Site-Wide Sampling and Analysis Plan*. In summary, samples were handled as follows:

- a sufficient volume of sample was placed into the laboratory certified containers,
- the rims of the jars were wiped with a disposable towel to ensure a proper seal, and closed,
- samples were labeled using a permanent marker,
- samples were analyzed in the field using the field portable XRF,
- samples to be analyzed by the laboratory were placed in a cooler and kept below 4°C,
- the date, sample time and analysis were recorded,
- chain of custody forms were properly completed for the laboratory samples, and
- samples were shipped via an overnight parcel service to the laboratory in sealed containers with custody seals.

2.4 Decontamination

Care was taken to minimize sample contamination by using disposable plastic sheeting between each sample and by using new disposable latex gloves between each sample process. All reusable equipment was decontaminated between each sample point according to the approved decontamination procedures described in the *MRFI Workplan Addendum*.

2.5 Analytical Procedure

2.5.1 Field Analysis

All soil samples were analyzed for total lead using the field portable XRF according to the approved *MRFI Work Plan addendum* and according to the XRF user's manual. XRF field data are provided in Table 2.

2.5.2 Laboratory Analysis

Laboratory analysis was performed according to the approved MRFI WorkPlan Addendum. Seventeen soil samples were sent to ACZ Laboratories, Inc. in Steamboat Springs, Colorado, an approved EPA laboratory. Laboratory data sheets are provided in Attachment 1.

Laboratory sample preparation was performed according to the approved MRFI WorkPlan Addendum. In summary, the following analyses were performed:

- Total soil samples were homogenized and then divided in half. One half of the sample was analyzed for total lead. Digestion was performed according to EPA Method 3051 and the extract was analyzed by EPA SW-846 Method 6010B. The second half was weighed and sieved for the fine fraction (that portion which passes a 250 μm sieve). The fine fraction was analyzed for total lead by using digestion according to EPA Method 3051 and the extract was analyzed by EPA SW-846 Method 6010B.
- Two samples were sent to the laboratory to be analyzed for antimony, arsenic and cadmium by using digestion according to EPA Method 3051 and the extract was analyzed by EPA SW-846 Method 6010B.

2.6 Quality Assurance Project Plan (QAPP)

The Quality Assurance Project Plan (QAPP) was performed according to the MRFI Workplan Addendum and according to all applicable technical standards, EPA requirements, regulations, and guidance. Laboratory data was validated for twenty-five percent (25%) of the laboratory samples, including the 2 samples analyzed for arsenic, antimony and cadmium concentrations.

Two duplicate samples were collected and three rinsate blanks were collected. Rinsate blanks were prepared by pouring distilled water over decontaminated sampling equipment and collecting it into appropriate laboratory supplied containers. Rinsate blanks were submitted to ACZ laboratories for total lead analysis using EPA Method M200.7.

Duplicate samples and laboratory and field XRF samples were compared by calculating the relative percent difference (RPD). The RPD is the difference in the sample results, divided by the average of the sample results, and multiplied by 100. For this project, the absolute value of the RPD was not used to determine if the field XRF results were consistently higher or lower than the laboratory results. If one such trend was evident, then a correction factor would be applied to the field XRF results.

3.0 ANALYTICAL RESULTS

XRF and laboratory data results are provided in Tables 1 through 3. Field calibrations and a comparison between the field and laboratory data are provided in Table 4. Rinsate blank samples and duplicate sample results are provided in Table 5. Soil sample locations are illustrated in Figure 1.

3.1 Fine Fraction-Total Soil Sample Results

The comparison of fine and total soil sample results is reported in Table 1 and can be summarized as follows:

- An average of 74.1 % of the soil is in the fine fraction, passing a 60 mesh sieve.
- Lead soil concentrations did not vary significantly between the fine fraction and the total soil sample. On average, the relative percent difference between the lead concentration in the fine fraction and the total soil sample was 8.1%.

3.2 Laboratory and Field XRF Comparison

Laboratory and field XRF soil samples results are compared in Table 4 and the comparison can be summarized as follows:

- The laboratory and field XRF data showed very good reproducibility. The average RPD between the laboratory and field sample was 0.93 % and the RPD for 88.2% of the samples were within 35%, the EPA standard RPD for soil duplicates.
- Two sample pairs had RPD greater than 35%. In one sample pair, the laboratory analysis had a higher concentration than the field XRF concentration, and in the other sample the laboratory analysis reported a lower concentration than the field XRF concentration. This suggests that heterogeneity in the sample results is a result of heterogeneity in the soil.

The laboratory and field XRF comparison illustrates that the field and laboratory data were in good agreement and that heterogeneity in the sample results were a result of heterogeneity in the soil.

3.3 Surface Soil Sampling Analytical Results

Surface soil samples results are provided in Table 1 and Table 2. The results can be summarized as follows:

- Surface soil lead concentrations decrease rapidly with increasing distance from the site. Soil lead concentrations were below Region 9 PRGs for residential soil within approximately 146 feet to the north on T-1, 493 feet to the north on T-2, 970 feet to the northeast on T-5 and 304 feet to the northeast on T-3.
- Soil concentrations to the north of the site decreased to 605 mg/kg and then increased along the road north of the site.
- Soil concentrations along the eastern boundary of the site varied significantly. The highest lead concentrations were located closest to Area A, the former remediation unit with the highest concentrations of lead on the site, and extended approximately 262 feet to the east. The former Area A has been remediated and contained within the CAMU.
- It is evident that material containing lead was used as fill material in all offsite areas. It is likely that all of the fill material was in place during historic operations at the USS Lead site, and the historic emissions from the site would be in addition to the lead in the fill material. The presence of fill material was clearly evident during sampling of Transect 5 in several places. First, railroad ties and debris are visually present in the triangle area. Second, it was evident that the swales in the dune and swale topography had been filled with slag-like material containing lead. Soil concentrations on the dunes were well below

Region 9 PRGs for residential soil (average 71 mg/kg) and in the swale, concentrations were above Region 9 PRGs for residential soil (average 799 mg/kg). Two such locations, T5-6 and T5-5, respectively, were located only 42 feet apart.

- The low concentrations of lead (below Region 9 PRGs for residential soil) on the dunes and measured in samples north and northeast of the USS Lead site suggest that emissions from the smelter stack at the USS Lead site were not significant, and in the dominant wind direction, extended no more than 970 feet. Further it appears that the area of influence was strongly elliptical as illustrated in Figure 2.
- There were no trends from the USS site along Transect 4 except that lead concentrations are higher along Kennedy Road east of the site than other samples and sample trends away from the site (i.e. Transect 1 and 2). High lead concentrations due east of the slag pile storage area (Area A) were observed and can be attributed to the USS Lead site, however the average concentration of samples along Transect 4 was 2,850 mg/kg (excluding samples T4-9 and T4-10) which suggests that the fill material used during construction of the road/railroad/cable/pipeline and the influence from automobile exhaust on Kennedy Avenue increased lead concentrations to 1000-3000 mg/kg. This is further substantiated by the depth profiles at T4-6 and T4-10 which contained concentrations greater than 1000 mg/kg at depth before reaching refusal at 18 and 12 inches bgs, respectively.

3.4 Depth Profile Analytical Results

Six depth profiles were performed. Depth profile soil samples results are provided in Table 3 and the results can be summarized as follows:

- Four of the six soil profiles had soil concentrations decrease with increasing depth. Sample lead concentrations in three of the four profiles were below Region 9 PRGs for residential soil (400 mg/kg) at 6 to 12" bgs.
- At sample location T4-10, the soil concentration increase and then the soil auger encountered refusal at 12" bgs. This suggests that fill material was used and the extent of contamination from the USS Lead Site could not be determined.
- Refusal was also reached at depth profile location T4-6 at 18" bgs.
- At sample location T3-3, all three samples taken during the depth profile were below Region 9 PRGs for residential soil (400 mg/kg).

4.0 EXTENT OF CONTAMINATION

As stated in the *Draft MRFI Report*, multiple off-site sources of airborne lead, as well as lead contained in fill, auto exhaust and manufacturing processes, are known to have existed in the vicinity of the site. Below is a description of contaminant transport mechanism, property activities and sampling conducted in the vicinity of the USS Lead site. These factors have assisted in the delineation of the nature and extent of contamination from the USS Lead site.

4.1 South

During the onsite April 20, 2001 meeting, US EPA, TechLaw, USS Lead, and Geochemical Solutions discussed the following:

Migration of Contamination. Off-site migration of contamination by surface water runoff from the USS Lead site to the south is not possible due to the Grand Calumet River acting as a surface water runoff barrier. Therefore, air deposition is the only possible mechanism of transport of contamination to the south, and contaminant transport to the south is not expected to be significant since that is not the dominant wind direction.

Adjacent Property Activities. South of the Grand Calumet River, to the south of the USS Lead site is a tank field owned and operated by Phillips Petroleum. Activities associated with tank fields include possible soil contamination of lead. Sampling to determine the nature and extent of windborne contamination from the USS Lead site can not be distinguished from the current activities on the adjacent properties to the south of the USS Lead site.

Sampling. Sampling to the south of the USS Lead site was not conducted.

4.2 West

During the onsite April 20, 2001 meeting, US EPA, TechLaw, USS Lead, and Geochemical Solutions discussed the following:

Migration of Contamination. Off-site migration of contamination by surface water runoff from the USS Lead site to the west is not possible due to the Indiana Harbor Canal acting as a surface water runoff barrier. Therefore, air deposition is the only possible mechanism of transport of contamination to the west, and contaminant transport to the west is not expected to be significant since that is not the dominant wind direction.

Adjacent Property Activities. West of the Indiana Harbor Canal to the west of the USS Lead site is an area owned by East Chicago Industrial Center which is believed to be a landfill. Activities associated with landfills include reworking materials placed there in layers and possible soil contamination of lead. Sampling to determine the nature and extent of windborne contamination from the USS Lead site can not be distinguished from the current activities on the adjacent properties to the west of the USS Lead site.

Sampling. Sampling to the west of the USS Lead site was not conducted.

4.3 North

During the onsite April 20, 2001 meeting, US EPA, TechLaw, USS Lead, and Geochemical Solutions discussed the following:

Migration of Contamination. To the north, the railroad provides a surface water contaminant migration barrier adjacent to the USS Lead site. USS Lead has removed off-site material believed to have migrated by surface water runoff. This material was removed and consolidated into the CAMU according to the *Railroad Property Material Removal Work Plan*, prepared by Adrian Brown Consultants, Inc., dated May 17, 1999. Confirmatory samples were submitted to US EPA as part of the *Draft MRFI Report*, prepared by LAW, dated December 29, 2000. According to the *Railroad Property Material Removal Work Plan* and *Draft MRFI Report* confirmatory railroad sampling data (Figures 3 and 4 and Table 2 of the *Draft MRFI Report*, dated December 29, 2000), soil lead concentrations were measured below Region 9 Preliminary Remediation Goals (PRGs) for residential soil to the northwest of the site, in close proximity to the northwest corner of the property fence. Therefore,

air deposition is the only possible mechanism of transport of contamination to the north, and the extent of contamination from windborne deposition is limited to due north of the fenced USS Lead property and east of the samples which already had measured lead soil concentrations below Region 9 PRGs for residential soil.

Adjacent Property Activities. Due north of the USS Lead fenced property are several sets of railroad tracks and an underground pipeline. The materials for these activities are unknown and are not the responsibility of USS Lead. Therefore, as discussed with US EPA, sampling to the north was limited to those samples which were taken outside of the railroad and the underground pipeline influences.

Sampling. USS Lead delineated the nature and extent of windborne contamination to the north by using two (2) transects extending to the north, Transect 1 and Transect 2 and one perpendicular which ran northwest-southeast from Transect 3, as illustrated in Figure 1. Soil concentrations were below Region 9 PRGs for residential soil within on average 320 feet to the north (average distance for Transect 1 and Transect 2). Concentrations on Transect 2 began to increase as the transect approached the road to the north of the site. From the *Draft MRFI Report* is the following:

In the *Indiana's 1999 State of the Environment Report*, statewide lead emissions steadily decreased during the 1980's, but have actually been on the rise since 1993. From 1993 to 1996 statewide emissions of lead increased from approximately 49 tons per year in 1993 to 58 tons per year in 1996. Prior to lead removal from gasoline, lead from automobile emissions was a significant contributor to lead in the environment, particularly in the Greater Chicago area where heavy automobile traffic has existed for nearly a century.

Therefore, sampling was halted.

4.4 Northeast

During the onsite April 20, 2001 meeting, US EPA, TechLaw, USS Lead, and Geochemical Solutions discussed the following:

Migration of Contamination. To the northeast, the railroad provides a surface water contaminant migration barrier adjacent to the USS Lead site. USS Lead has removed off-site material believed to have migrated by surface water runoff. This material was removed and consolidated into the CAMU according to the *Railroad Property Material Removal Work Plan*, prepared by Adrian Brown Consultants, Inc., dated May 17, 1999. Confirmatory samples were submitted to US EPA as part of the *Draft MRFI Report*, prepared by LAW, dated December 29, 2000. According to the *Draft MRFI Report* confirmatory railroad sampling data (Figures 3 and 4 and Table 2 of the *Draft MRFI Report*, dated December 29, 2000), soil lead concentrations were measured below Region 9 PRGs for residential soil to the northeast of the site, and southwest of the railroad tracks.

Adjacent Property Activities. Northeast of the USS Lead fenced property are several sets of railroad tracks, an underground pipeline and Kennedy Avenue. The immediate area northeast has been called the "triangle" due to the shape formed by the railroad tracks and is illustrated in Figure 2. The "triangle" has been used as a dumping ground by many parties and is not the responsibility of USS Lead. However, the northeast

appears to be the dominant wind direction, and as discussed with US EPA, sampling to the northeast was conducted to attempt to determine any contribution of lead from the USS Lead site.

Sampling. USS Lead sampled two transects and one perpendicular to the northeast from the USS Lead site, as illustrated in Figure 1. Transect 3 and Transect 5 to the northeast determined that lead concentrations decreased rapidly (average distance 637 feet) from the north end of the USS Lead site to below Region 9 PRGs for residential soils.

4.5 East

During the onsite April 20, 2001 meeting, US EPA, TechLaw, USS Lead, and Geochemical Solutions discussed the following:

Migration of Contamination. To the east, the railroad provides a surface water contaminant migration barrier adjacent to the USS Lead site. USS Lead has removed off-site material believed to have migrated by surface water runoff. This material was removed and consolidated into the CAMU according to the *Railroad Property Material Removal Work Plan*, prepared by Adrian Brown Consultants, Inc., dated May 17, 1999. Confirmatory samples were submitted to US EPA as part of the *Draft MRFI Report*, prepared by LAW, dated December 29, 2000. According to the *Draft MRFI Report* confirmatory railroad sampling data (Figures 3 and 4 and Table 2 of the *Draft MRFI Report*, dated December 29, 2000), soil lead concentrations were measured below Region 9 PRGs for residential soil to the east of the site, and west of the railroad tracks.

Adjacent Property Activities. Due east of the USS Lead fenced property are several sets of railroad tracks, an underground pipeline and Kennedy Avenue. East of Kennedy Avenue the property is owned and operated by Grace Davison. The materials for activities associated with these properties are unknown and are not the responsibility of USS Lead, therefore, as discussed with US EPA, sampling to the east will be limited to those samples which can be taken outside of these influences.

Sampling. USS Lead used one transect and two perpendiculars between the railroad tracks and Kennedy Avenue extending north-south along the USS Lead property, as illustrated in Figure 1. The transect along the eastern side of USS Lead determined that windborne contaminant migration to the east was present and congregated at the edge of the railroad tracks and at the edge of Kennedy Road. Concentrations quickly decreased east of Kennedy Avenue. Sampling was halted at the fence and concrete on Grace Davison property.

5.0 CONCLUSIONS

The off-site sampling results delineated the nature and extent of off-site contamination from the USS Lead site. The following conclusions can be made from the results of the off-site sampling and analysis conducted in accordance with the approved MRFI Work Plan Addendum:

- Surface soil lead concentrations decrease rapidly with increasing distance from the site. USS Lead potential influence on soil lead concentrations were within 320 feet to the north (average distance from Transect 1 and Transect 2), within 637 feet to the north-northeast (Transect 3 and Transect 5) and within approximately 262 feet to the east (Perpendicular 2). One potential area of influence from the USS Lead site to the northeast is present and appears to be elliptical in shape. The potential area of influence to the northeast is illustrated in Figure 2.
- Soil concentrations in Transect 2 decreased to 605 mg/kg and then increased along the road north of the site.
- Soil concentrations along the eastern boundary of the site varied significantly, however were higher than lead concentrations measured on other transects. The highest lead concentrations were located closest to Area A, the former remediation unit with the highest concentrations of lead on the site. Area A has been remediated and contained within the CAMU. High soil lead concentrations east of the site are influenced by material used as fill, topographic highs and low such as Kennedy Road, and automobile exhaust. The potential area of influence from Area A to the east is illustrated in Figure 2.
- It is evident that material containing lead was used as fill material in the area around the site. This was evident during sampling of Transect 5 and during depth profiles in Transect 4.
- USS Lead has potential influence on 2 areas illustrated in Figure 2, however, within those areas, there are other sources of lead containing material and activities other than USS Lead.

Table 1. Laboratory Data Results.

Sample Number	Sample Date	Laboratory ID	Lab Batch	Fine Fraction		Sieve- 250 um (60 mesh)	Fine-Total RPD %	Antimony mg/kg M6020 ICPMS	Arsenic mg/kg M6020 ICPMS	Cadmium mg/kg M6010B ICP	Notes
				Lead Concentration mg/kg M6010B ICP	Total Soil Lead Concentration mg/kg M6010B ICP						
T1-1L	5/3/2001 ACZ		L31916	496	555	96.4	-11.2				
T1-2L	5/3/2001 ACZ		L31916	349	390	94.7	-11.1				
T1-3L	5/3/2001 ACZ		L31916	324	433	95.2	-28.8				Duplicate of aT1-2
T2-1L	5/3/2001 ACZ		L31916	3500	4310	80	-20.7				
T2-2L	5/3/2001 ACZ		L31916	2900	3790	79.5	-26.6				
T2-3L	5/3/2001 ACZ		L31916	1540	2380	66.7	-42.9				
T2-5L	5/3/2001 ACZ		L31916	3930	4100	78.5	-4.2				Duplicate of T2-1
T1-5L	6/5/2001 ACZ		L32387	273	289	95	-5.7				
T2-1-CL	6/5/2001 ACZ		L32387	16	17	96	-6.1	50.1 J		3.4	0.4
T3-3-2BL	6/6/2001 ACZ		L32387	64	65	93	-1.6				
P1-S1BL	6/6/2001 ACZ		L32387	499	573	50	-13.8				
P1-S2-2L	6/6/2001 ACZ		L32387	1660	1650	20	0.6				
P2-E1-FL	6/7/2001 ACZ		L32387	1520	1040	45	37.5				
P2-E3-2L	6/7/2001 ACZ		L32387	1470	1280	48	13.8				
T4-10a-L	6/7/2001 ACZ		L32387	2270	2360	60	-3.9	49		111	7
T5-5-2L	6/8/2001 ACZ		L32426	473	498	77	-5.1				
T5-6-2L	6/8/2001 ACZ		L32426	46	50	84	-8.3				
Average					74.1		-8.1				

J = value estimated due to QC outside of acceptable limits

Table 2. XRF Field Data.

Sample location	Field XRF result (ppm)	Cluster Sample 2	Cluster Sample 3	Average Concentration	Notes
T1-1	548				
T1-2	490	332	450	424	
T1-4	491				
T1-5	392	83	288	254.3	
T2-1	4094				
T2-2	3110				
T2-3	1959				
T2-4	1465				
T2-4.5	605				
T2-6	702				EPA sample in neighborhood Pb = 100 mg/kg
T3-1	2412				
T3-1N	2835				
T3-2	1770				
T3-3	190.5	73.5	161	141.7	6-12" below ground surface, at highest concentration of depth profile
P1-S1	408	486	465.5	453.2	
P1-S2	372.5	1556.5	332		Average not appropriate due to site activities
P1-N1	2504				
P1-N2	4818				
P1-N3	2509				
P1-N4	7750				
P1-N5	1264				Crosses T-2 at T2-6
T4-1	2652				
T4-2	3129				
T4-3	1260				
T4-4	3206				
T4-5	7530				
T4-6	4834				
T4-7	2303				
T4-8	1688				
T4-9	11,760				
T4-10	17,490				
T4-11	2240				
T4-12	1686				
T4-13	819				Stop at Grand Calumet River
T5-2S	4660				
T5-1S	5642				
T5-1	5016				
T5-2	4712				
T5-3	2543				
T5-4	557				
T5-5	937	456	1004	799	Sample is fill
T5-6	30.5	78.5	103.5	71	Native material
P2-E1	22,350				
P2-E2	1996				
P2-E3	2596	1342	832	1590	End at Grace cement & buildings
P3-E1	1931				
P4-E1	18,000				between P2-E1 and P3-E1

Table 3. XRF Field Data - Depth Profiles.

Depth Profiles	Field XRF result (ppm)	Start Depth (inches bgs)	End Depth (inches bgs)
T2-1A	2350	0	6
T2-1B	196	6	12
T2-1C	Undetected	12	18
T3-3A	190.5	0	6
T3-3B	328.5	6	12
T3-3C	129	12	18
T4-6A	4834	0	6
T4-6B	2264	6	12
T4-6C	984	12	18
T4-6D	Refusal at 18" bgs		
P1-S1-A	408	0	6
P1-S1-B	389	6	12
P1-S1-C	143.5	12	18
T4-10A	1953	0	6
T4-10B	2625	6	12
T4-10C	Refusal at 12" bgs (3 attempts)		
P2-E1-A	21,550	0	6
P2-E1-B	4144	6	12
P2-E1-C	2294	12	18
P2-E1-D	844	18	24
P2-E1-E	854	24	30
P2-E1-F	934	30	36

Table 4. Field Calibration Table.

Sample Number	Laboratory Sample Date	Lab Total Lead mg/kg M6010B ICP	Field Lead ppm	RPD %	Notes
T1-1L	5/3/2001	555	548	1.27	
T1-2L	5/3/2001	390	490	-22.73	
T1-3L	5/3/2001	433	490	-12.35	Duplicate of aT1-2
T2-1L	5/3/2001	4310	4094	5.14	
T2-2L	5/3/2001	3790	3110	19.71	
T2-3L	5/3/2001	2380	1959	19.41	
T2-5L	5/3/2001	4100	4094	0.15	Duplicate of T2-1
T1-5L	6/5/2001	289	288	0.35	
T2-1-CL	6/5/2001	17	<20	-16.22	
T3-3-2BL	6/6/2001	65	73.5	-12.27	
P1-S1BL	6/6/2001	573	389	38.25	
P1-S2-2L	6/6/2001	1650	1556.5	5.83	
P2-E1-FL	6/7/2001	1040	934	10.74	
P2-E3-2L	6/7/2001	1280	1342	-4.73	
T4-10a-L	6/7/2001	2360	1953	18.87	
T5-5-2L	6/8/2001	498	456	8.81	
T5-6-2L	6/8/2001	50	78.5	-44.36	
Percent within 35%				88.2	
Average				0.93	

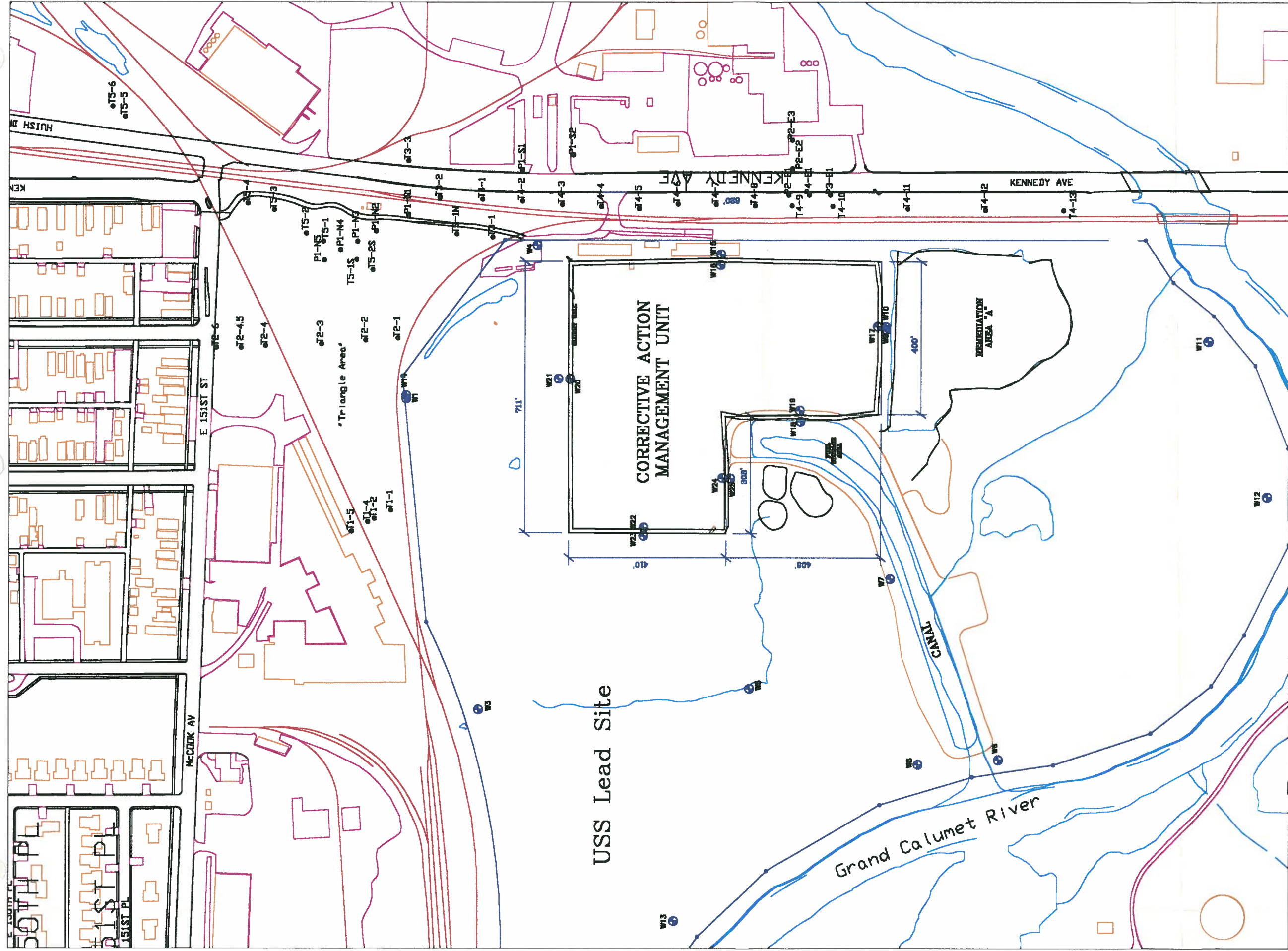
Table 5. QA/QC Data.

Water Samples				
Sample Number	Sample Date	Lab Name	Lab Batch ID	Lead, total M200.7 ICP mg/L
T2-4L	5/3/2001	ACZ	L31918	<0.04 U
Eq Blk-1	6/6/2001	ACZ	L32387	<0.04 U
Eq Blk-2	6/8/2001	ACZ	L32426	0.14 B

Soil Samples	Fine Fraction					
	Lead Concentration mg/kg	Total Soil Lead Concentration mg/kg	Sieve- 250 um (60 mesh) % passing	Notes		
EPA Method Number M6010B ICP M6010B ICP ASA No.9, 15-4.2.2						
T1-2L	5/3/2001 ACZ	L31916	349	390	94.7	
T1-3L	5/3/2001 ACZ	L31916	324	433	95.2	Duplicate of aT1-2
RPD (%)			-7.43		10.45	0.53
T2-1L	5/3/2001 ACZ	L31916	3500	4310	80	
T2-5L	5/3/2001 ACZ	L31916	3930	4100	78.5	Duplicate of T2-1
RPD (%)			11.57		-4.99	-1.89

U = Analyte was analyzed but not detected at the indicated MDL

B = Analyte concentration detected at a value between the MDL and PQL



Legend

● TS-5
● Off-Site Sampling Location



Figure 1 Off-Site Sampling Location Map

Norman Johnson
Mining Remedial Recovery Company
340 Hardscrabble Road
Helper, UT 84526

May 11, 2001

cc: Jeff Woelfer, Wendy Meyer,

Project: L31916

Norman Johnson:

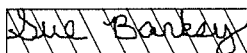
Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on May 08, 2001. This project has been assigned to ACZ's project number, L31916. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 7.0. The enclosed results relate only to the samples received under L31916. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Please assess the enclosed report only in its entirety. ACZ prohibits the reproduction of this report, except in full, without the written approval of ACZ. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after June 11, 2001. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs.

If you have any questions, please contact your Project Manager or Customer Service Representative.



11/May/01

Susan K. Barkey, Project Manager, has reviewed and accepted this report in its entirety

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T1-1Lt

ACZ ID: **L31916-01**

Date Sampled: 05/03/01 11:00

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	555		mg/Kg	4	20	05/10/01 14:19	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.1		%	0.1	0.5	05/09/01 15:18	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Digestion - Hot Plate	M3050 ICP						05/09/01 14:06	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T1-1Lf

ACZ ID: L31916-02

Date Sampled: 05/03/01 11:00

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	496		mg/Kg	4	20	05/10/01 14:22	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	99.9		%	0.1	0.5	05/09/01 14:48	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						05/08/01 17:45	lb
Digestion - Hot Plate	M3050 ICP						05/09/01 15:09	lb
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2						05/09/01 8:30	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T1-2Lt

ACZ ID: **L31916-03**

Date Sampled: 05/03/01 11:15

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	390		mg/Kg	4	20	05/10/01 14:26	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.7		%	0.1	0.5	05/09/01 15:21	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Digestion - Hot Plate	M3050 ICP						05/09/01 16:13	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T1-2Lf

ACZ ID: L31916-04

Date Sampled: 05/03/01 11:15

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	349		mg/Kg	4	20	05/10/01 14:30	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	99.9		%	0.1	0.5	05/09/01 14:51	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						05/08/01 17:46	lb
Digestion - Hot Plate	M3050 ICP						05/09/01 17:16	lb
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2						05/09/01 8:54	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T1-3Lt

ACZ ID: **L31916-05**

Date Sampled: 05/03/01 11:20

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	433		mg/Kg	4	20	05/10/01 14:33	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.7		%	0.1	0.5	05/09/01 15:24	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Digestion - Hot Plate	M3050 ICP						05/09/01 18:19	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T1-3Lf

ACZ ID: L31916-06

Date Sampled: 05/03/01 11:20

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	324		mg/Kg	4	20	05/10/01 14:44	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	99.8		%	0.1	0.5	05/09/01 14:54	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						05/08/01 17:48	lb
Digestion - Hot Plate	M3050 ICP						05/09/01 19:22	lb
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2						05/09/01 9:18	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T2-1Lt

ACZ ID: **L31916-07**

Date Sampled: 05/03/01 12:10

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	4310		mg/Kg	5	20	05/10/01 14:47	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	86.6		%	0.1	0.5	05/09/01 15:27	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Digestion - Hot Plate	M3050 ICP						05/09/01 20:26	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T2-1Lf

ACZ ID: L31916-08

Date Sampled: 05/03/01 12:10

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	3500		mg/Kg	4	20	05/10/01 14:51	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	99.2		%	0.1	0.5	05/09/01 14:57	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						05/08/01 17:50	lb
Digestion - Hot Plate	M3050 ICP						05/09/01 21:29	lb
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2						05/09/01 9:43	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T2-2Lt

ACZ ID: **L31916-09**

Date Sampled: 05/03/01 11:55

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	3790		mg/Kg	5	20	05/10/01 14:55	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	80.9		%	0.1	0.5	05/09/01 15:30	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Digestion - Hot Plate	M3050 ICP						05/09/01 22:32	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T2-2Lf

ACZ ID: L31916-10

Date Sampled: 05/03/01 11:55

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	2900		mg/Kg	4	20	05/10/01 14:58	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	98.4		%	0.1	0.5	05/09/01 15:00	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						05/08/01 17:52	lb
Digestion - Hot Plate	M3050 ICP						05/09/01 23:35	lb
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2						05/09/01 10:07	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T2-3Lt

ACZ ID: **L31916-11**

Date Sampled: 05/03/01 11:35

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	2380		mg/Kg	5	30	05/10/01 15:02	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	69.3		%	0.1	0.5	05/09/01 15:33	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Digestion - Hot Plate	M3050 ICP						05/10/01 0:39	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T2-3Lf

ACZ ID: L31916-12

Date Sampled: 05/03/01 11:35

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	1540		mg/Kg	4	20	05/10/01 15:05	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.4		%	0.1	0.5	05/09/01 15:03	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						05/08/01 17:54	lb
Digestion - Hot Plate	M3050 ICP						05/10/01 1:42	lb
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2						05/09/01 10:31	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T2-5Lt

ACZ ID: **L31916-13**

Date Sampled: 05/03/01 12:15

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	4100		mg/Kg	5	20	05/10/01 15:09	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	88.2		%	0.1	0.5	05/09/01 15:36	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Digestion - Hot Plate	M3050 ICP						05/10/01 2:45	lb

Mining Remedial Recovery Company

Project ID: USS Lead
Sample ID: L31916-13 MS

ACZ ID: **L31916-14**

Date Sampled: 05/03/01 12:15

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	4340		mg/Kg	5	20	05/10/01 15:13	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	85.3		%	0.1	0.5	05/09/01 15:39	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Digestion - Hot Plate	M3050 ICP						05/10/01 3:49	lb

Mining Remedial Recovery Company

Project ID: USS Lead
Sample ID: L31916-13 MSD

ACZ ID: **L31916-15**
Date Sampled: 05/03/01 12:15
Date Received: 5/8/01
Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	4030		mg/Kg	5	20	05/10/01 15:31	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	87.0		%	0.1	0.5	05/09/01 15:42	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Digestion - Hot Plate	M3050 ICP						05/10/01 5:55	lb

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T2-5Lf

ACZ ID: L31916-16

Date Sampled: 05/03/01 12:15

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	3930		mg/Kg	4	20	05/10/01 15:38	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	99.3		%	0.1	0.5	05/09/01 15:06	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						05/08/01 17:56	lb
Digestion - Hot Plate	M3050 ICP						05/10/01 8:02	lb
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2						05/09/01 10:56	lb

Mining Remedial Recovery Company

Project ID: USS Lead
Sample ID: L31916-16 MS

ACZ ID: **L31916-17**

Date Sampled: 05/03/01 12:15
Date Received: 5/8/01
Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	4200		mg/Kg	4	20	05/10/01 15:41	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	99.4		%	0.1	0.5	05/09/01 15:09	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						05/08/01 17:58	lb
Digestion - Hot Plate	M3050 ICP						05/10/01 9:05	lb
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2						05/09/01 11:20	lb

Mining Remedial Recovery Company

Project ID: USS Lead
Sample ID: L31916-16 MSD

ACZ ID: **L31916-18**

Date Sampled: 05/03/01 12:15

Date Received: 5/8/01

Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total (3050)	M6010B ICP	3750		mg/Kg	4	20	05/10/01 15:52	ct

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	99.4		%	0.1	0.5	05/09/01 15:12	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						05/08/01 17:59	lb
Digestion - Hot Plate	M3050 ICP						05/10/01 11:11	lb
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2						05/09/01 11:44	lb

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LFM</i>	Laboratory Fortified Matrix
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
U	Analyte was analyzed for but not detected at the indicated MDL
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
W	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
X	Quality control sample is out of control.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update II, September 1994.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

Mining Remedial Recovery Company

ACZ Project ID: **L31916**

Project ID: **USS Lead**

Lead, total (3050)

M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG121314													
WG121252PBS	PBS	05/10/01 14:12				U	mg/Kg		-4	4			
WG121252LCSS	LCSS	05/10/01 14:15	PCN14019	186		175.7	mg/Kg		139	233			
L31916-14MS	MS	05/10/01 15:27	II010430-3	116.1508	4340	3995.3	mg/Kg	-296.8	75	125			Z
L31916-15DUP	DUP	05/10/01 15:34			4030	4259.1	mg/Kg				5.5	35	
L31916-17MS	MS	05/10/01 15:49	II010430-3	100.13	4200	4048.9	mg/Kg	-150.9	75	125			Z
L31916-18DUP	DUP	05/10/01 15:56			3750	4137.6	mg/Kg				9.8	35	

Solids, Percent

CLPSOW390, PART F, D-98

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG121264													
WG121264PBS	PBS	05/09/01 14:45				U	%		-0.1	0.1			
L31916-18DUP	DUP	05/09/01 15:15			99.4	99.4	%				0	35	
WG121265													
WG121265PBS	PBS	05/09/01 15:15				U	%		-0.1	0.1			
L31916-15DUP	DUP	05/09/01 15:45			87	87.49	%				0.6	35	

Mining Remedial Recovery Company
USS Lead

ACZ Project ID: L31916
Date Received: 5/8/01
Received By: dale

Receipt Verification

- 1) Does this project require special handling procedures such as CLP protocol?
- 2) Are the custody seals on the cooler intact?
- 3) Are the custody seals on the sample containers intact?
- 4) Is there a Chain of Custody or other directive shipping papers present?
- 5) Is the Chain of Custody complete?
- 6) Is the Chain of Custody in agreement with the samples received?
- 7) Is there enough sample for all requested analyses?
- 8) Are all samples within holding times for requested analyses?
- 9) Were all sample containers received intact?
- 10) Are the temperature blanks present?
- 11) Are the trip blanks (VOA and/or Cyanide) present?
- 12) Are samples requiring no headspace, headspace free?
- 13) Do the samples that require a Foreign Soils Permit have one?

YES	NO	NA
		√
√		
		√
√		
√		
√		
√		
√		
		√
		√
		√
		√

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (μR/hr)
acz		12

Notes

Mining Remedial Recovery Company
USS Lead

ACZ Project ID: L31916
Date Received: 5/8/01
Received By: dale

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	Y < 2	YG < 2	B < 2	BG < 2	O < 2	T > 12	P > 12	N/A	RAD
L31916-01	T1-1Lt										O	
L31916-02	T1-1Lf										O	
L31916-03	T1-2Lt										O	
L31916-04	T1-2Lf										O	
L31916-05	T1-3Lt										O	
L31916-06	T1-3Lf										O	
L31916-07	T2-1Lt										O	
L31916-08	T2-1Lf										O	
L31916-09	T2-2Lt										O	
L31916-10	T2-2Lf										O	
L31916-11	T2-3Lt										O	
L31916-12	T2-3Lf										O	
L31916-13	T2-5Lt										O	
L31916-14	L31916-13 MS										O	
L31916-15	L31916-13 MSD										O	
L31916-16	T2-5Lf										O	
L31916-17	L31916-16 MS										O	
L31916-18	L31916-16 MSD										O	



Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of
CUSTODY

L31916

Quote #:

ACZ Project #:

CLIENT INFORMATION

Name to appear on Report and Invoice

Carbon Copy: Report ☒ Invoice ☐

Norman Johnson

JEFF WOELFER

MRRC

DAI Environmental

340 Hardscrabble Rd.

27834 N. Irma Lee Circle

HELPER, UT 84526 Tel: (435) 472-3385 Lake Forest, IL 60045 Tel: 847-573-8900

Email: njohnson@sina.com

Email: woelfer@daieu.com

PROJECT INFORMATION

ANALYSES REQUESTED (required or attach bid list)

Client Project name and/or PO#:

USS Lead
East Chicago, IN

Shipping Company: FedEx

Tracking #:

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	TOTAL LEAD	TOTAL LEAD* (FINE FRACTION)															
T1-1L+	5/3/01/1100	SO	1	X																
T1-1Lf	1100				X															
T1-2L+	1115			X																
T1-2Lf	1115				X															
T1-3L+	1120			X																
T1-3Lf	1120				X															
T2-1L+	1210			X																
T2-1Lf	1210				X															
T2-2L+	1155			X																
T2-2Lf	1155				X															
T2-3L+	1135			X																
T2-3Lf	1135				X															

Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water)
Options SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

* Samples to be ~~filtered~~ ^{sieved} as per specifications provided by Wendy Meyer of Geochemical Solutions (fine fraction define as material which passes 60 mesh screen).

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME	PAGE
<i>Jeff Woelfer</i>	5/3/01 4:15pm	<i>Jeff</i>	5/8/01 10:30	1 of 2

FRMQA021.01.00.03

White - Return with sample.

Yellow - Retain for your records.

Quote #: ACZ Project #:

CLIENT INFORMATION

Name to appear on Report and Invoice

Carbon Copy: Report ☒ Invoice ☐

MRRC

DAI Environmental

340 Hardgerabble Rd.

27834 N. Irma Lee Circle

HELPER, UT 84526

Lake Forest, IL 60045

Attn: Norman Johnson

Tel: 435-472-3385

Attn: JEFF Woelfer

Tel: 847-573-8900

Email: n.johnson@sina.com

Email: woelfer@daientv.com

PROJECT INFORMATION

ANALYSES REQUESTED (required or attach bid list)

Client Project name and/or PO#:

USS Lead
East Chicago, IN

Shipping Company:

Fedex

Tracking #:

SAMPLE IDENTIFICATION

DATE:TIME

Matrix

of Containers

TOTAL LEAD

TOTAL LEAD
(FINE FRACTION)

T2-4L

5/3/01/1145

WW

1

X

T2-5L+

1/1215

SO

1

X

T2-5Lf

1/1215

SO

1

X

LEVEL 4 QA/QC

Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water)

Options SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

* Sample to be sieved prior to analysis - analyze fine fraction for Total Lead as specified by Wendy Meyer of Geochemical Solutions (fine fraction defined as material passing 60 mesh screen)

RELINQUISHED BY:

DATE:TIME

RECEIVED BY:

DATE:TIME PAGE

Jeff Woelfer

5/3/01 4:57pm

of 2

ACZ

Workgroup Review - Run Approval

WG121205

Date Reported: 09-May-01

Run ID: R158822

Date Analyzed: 08-May-01

SampleNum	Tag	DStatus	Parm_Stored	Value	Dil	Qual	Units	Appv	MDL	RDL	TextValue
L31916-02		SREV	SP AIRDRY		1			NEED			
L31916-04		SREV	SP AIRDRY		1			NEED			
L31916-06		SREV	SP AIRDRY		1			NEED			
L31916-08		SREV	SP AIRDRY		1			NEED			
L31916-10		SREV	SP AIRDRY		1			NEED			
L31916-12		SREV	SP AIRDRY		1			NEED			
L31916-16		SREV	SP AIRDRY		1			NEED			
L31916-17		SREV	SP AIRDRY		1			NEED			
L31916-18		SREV	SP AIRDRY		1			NEED			

Initials: AC 5/9/01

REP99GWAVAIL.SXS

ir Dry

QC List Type: I-SP-AIRDRY
QCListMatClass: SOLID
Bench Sheet List: I-SP-AIRDRY
QC Ref: NOQC
Group ID: SP-G-DRY-AIR
Method Ref: No 1 1972
SOP Ref: see bwc

WG121205

ACZ Laboratories, Inc

Instrument ID: SOILSPREP

Analyst: lb

ACZ Dept: 20

Create Date: 05/08/2001 5:44:49 PM

Start Date/Time: 05/08/2001 5:45:00 PM

End Date/Time: 05/08/2001 6:00:00 PM

SEQ	ACZ ID	Client ID	Subs	Pri	Analysis Date	SP	AirDry	Comments
-----	--------	-----------	------	-----	---------------	----	--------	----------

1	L31916-02	T1-1Lf	-	30	05/08/2001 5:45:00 PM		05/08/2001	
2	L31916-04	T1-2Lf	-	30	05/08/2001 5:46:52 PM		05/08/2001	
3	L31916-06	T1-3Lf	-	30	05/08/2001 5:48:44 PM		05/08/2001	
4	L31916-08	T2-1Lf	-	30	05/08/2001 5:50:36 PM		05/08/2001	
5	L31916-10	T2-2Lf	-	30	05/08/2001 5:52:28 PM		05/08/2001	
6	L31916-12	T2-3Lf	-	30	05/08/2001 5:54:20 PM		05/08/2001	
7	L31916-16	T2-5Lf	-	30	05/08/2001 5:56:12 PM		05/08/2001	
8	L31916-17	L31916-16 MS	-	30	05/08/2001 5:58:04 PM		05/08/2001	
9	L31916-18	L31916-16 MSD	-	30	05/08/2001 5:59:56 PM		05/08/2001	

Sample Login Comments

L31916-02 8oz Black SJ
L31916-04 8oz Black SJ
L31916-08 8oz Black SJ
L31916-10 8oz Black SJ
L31916-12 8oz Black SJ
L31916-16 8oz Black SJ
L31916-17 8oz Black SJ ***MS***
L31916-18 8oz Black SJ ***MSD***

Report Comments:

Internal Comments:

AREV: LAB 5/9/01
Initials, Date

SREV: lb 5/9/01
Initials, Date
5-10-01

Norman Johnson
Mining Remedial Recovery Company
340 Hardscrabble Road
Helper, UT 84526

May 11, 2001

cc: Jeff Woelfer, Wendy Meyer,

Project: L31918

Norman Johnson:

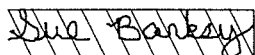
Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on May 08, 2001. This project has been assigned to ACZ's project number, L31918. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 7.0. The enclosed results relate only to the samples received under L31918. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Please assess the enclosed report only in its entirety. ACZ prohibits the reproduction of this report, except in full, without the written approval of ACZ. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after June 11, 2001. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs.

If you have any questions, please contact your Project Manager or Customer Service Representative.



11/May/01

Susan K. Barkey, Project Manager, has reviewed and accepted this report in its entirety

Mining Remedial Recovery Company

Project ID: USS Lead

Sample ID: T2-4L

ACZ ID: **L31918-01**

Date Sampled: 05/03/01 11:43

Date Received: 5/8/01

Sample Matrix: Waste Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Lead, total	M200.7 ICP		U	mg/L	0.04	0.2	05/10/01 22:06	ct

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP						05/10/01 15:00	kr

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LFM</i>	Laboratory Fortified Matrix
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL
R	Poor spike recovery accepted because the other spike in the set fell within the given limits.
T	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
U	Analyte was analyzed for but not detected at the indicated MDL
V	High blank data accepted because sample concentration is 10 times higher than blank concentration
W	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
X	Quality control sample is out of control.
Z	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update II, September 1994.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

Mining Remedial Recovery Company

ACZ Project ID: **L31918**

Project ID: USS Lead

Lead, total M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG121326													
WG121272LRB	LRB	05/10/01 19:50				U	mg/L		-0.088	0.088			
WG121272LFB	LFB	05/10/01 19:55	II010430-3	1.0013		1.027	mg/L	102.6	85	115			
WG121272LCSW	LCSW	05/10/01 19:59	IP010421-1	1		1.044	mg/L	104.4	85	115			
L31845-04LFM	LFM	05/10/01 21:15	II010423-6	2.0026	.11	2.126	mg/L	100.7	70	130			
L31845-04LFMD	LFMD	05/10/01 21:28	II010423-6	2.0026	.11	2.127	mg/L	100.7	70	130	0.05	20	

Mining Remedial Recovery Company
USS Lead

ACZ Project ID: L31918
Date Received: 5/8/01
Received By: dale

Receipt Verification

- 1) Does this project require special handling procedures such as CLP protocol?
- 2) Are the custody seals on the cooler intact?
- 3) Are the custody seals on the sample containers intact?
- 4) Is there a Chain of Custody or other directive shipping papers present?
- 5) Is the Chain of Custody complete?
- 6) Is the Chain of Custody in agreement with the samples received?
- 7) Is there enough sample for all requested analyses?
- 8) Are all samples within holding times for requested analyses?
- 9) Were all sample containers received intact?
- 10) Are the temperature blanks present?
- 11) Are the trip blanks (VOA and/or Cyanide) present?
- 12) Are samples requiring no headspace, headspace free?
- 13) Do the samples that require a Foreign Soils Permit have one?

YES	NO	NA
		√
√		
		√
√		
√		
√		
√		
√		
		√
		√
		√
		√

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (μR/hr)
acz			12

Notes

Mining Remedial Recovery Company
USS Lead

ACZ Project ID: L31918
Date Received: 5/8/01
Received By: dale

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	Y < 2	YG < 2	B < 2	BG < 2	O < 2	T > 12	P > 12	N/A	RAD
L31918-01	T2-4L	Y										

L 31918

ACZ Project #:

Name to appear on Report and Invoice

Carbon Copy: Report ☒ Invoice ☐

DAI Environmental

27834 N. Irma Lee Circle

Lake Forest, IL 60045

E-mail: hjohnson@sisna.com

Email: woelfer@da.ENV.UMM

ANALYSES REQUESTED (required or attach bio/isto)

USS Lead
East Chicago, IN

Shipping Company: Fedex

Tracking #:

of Containers

TOTAL LEAD

TOTAL LEAD		FINE FRACTION	
1	100	1	100
2	100	2	100
3	100	3	100
4	100	4	100
5	100	5	100
6	100	6	100
7	100	7	100
8	100	8	100
9	100	9	100
10	100	10	100
11	100	11	100
12	100	12	100
13	100	13	100
14	100	14	100
15	100	15	100
16	100	16	100
17	100	17	100
18	100	18	100
19	100	19	100
20	100	20	100
21	100	21	100
22	100	22	100
23	100	23	100
24	100	24	100
25	100	25	100
26	100	26	100
27	100	27	100
28	100	28	100
29	100	29	100
30	100	30	100
31	100	31	100
32	100	32	100
33	100	33	100
34	100	34	100
35	100	35	100
36	100	36	100
37	100	37	100
38	100	38	100
39	100	39	100
40	100	40	100
41	100	41	100
42	100	42	100
43	100	43	100
44	100	44	100
45	100	45	100
46	100	46	100
47	100	47	100
48	100	48	100
49	100	49	100
50	100	50	100
51	100	51	100
52	100	52	100
53	100	53	100
54	100	54	100
55	100	55	100
56	100	56	100
57	100	57	100
58	100	58	100
59	100	59	100
60	100	60	100
61	100	61	100
62	100	62	100
63	100	63	100
64	100	64	100
65	100	65	100
66	100	66	100
67	100	67	100
68	100	68	100
69	100	69	100
70	100	70	100
71	100	71	100
72	100	72	100
73	100	73	100
74	100	74	100
75	100	75	100
76	100	76	100
77	100	77	100
78	100	78	100
79	100	79	100
80	100	80	100
81	100	81	100
82	100	82	100
83	100	83	100
84	100	84	100
85	100	85	100
86	100	86	100
87	100	87	100
88	100	88	100
89	100	89	100
90	100	90	100
91	100	91	100
92	100	92	100
93	100	93	100
94	100	94	100
95	100	95	100
96	100	96	100
97	100	97	100
98	100	98	100
99	100	99	100
10			

DATE:TIME:

Matrix

5/3/01/143 WW

/

X

' / 1215	36
----------	----

/

X

↓	12.15	50
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1

Matrix	SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water)
Options	SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

* Sample to be Sieved prior to analysis - analyze fine fraction for Total Lead as specified by Wendy Meyer of Geochemical Solutions (fine fraction defined as material passing 60 mesh screen)

RELINQUISHED BY:

DATE: TIME:

RECEIVED BY:

DATE: TIME:

W. W. Welford

5/3/01 4:52m

257

5/0/01

REFERENCES

White - Return with sample

Yellow - R. 4.14 In and over is

10:30

Norman Johnson
Mining Remedial Recovery Company
340 Hardscrabble Road
Helper, UT 84526

June 11, 2001

cc: Wendy Meyer, Jeff Woelfer, Mirtha Capiro

Project: L32236

Norman Johnson:

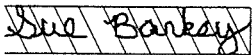
Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on May 31, 2001. This project has been assigned to ACZ's project number, L32236. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 7.0. The enclosed results relate only to the samples received under L32236. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Please assess the enclosed report only in its entirety. ACZ prohibits the reproduction of this report, except in full, without the written approval of ACZ. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 11, 2001. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs.

If you have any questions, please contact your Project Manager or Customer Service Representative.



11/June/01

Sue Barkey, Project Manager, has reviewed and accepted this report in its entirety.

Mining Remedial Recovery Company

Project ID: USS LEAD

Sample ID: T1-1LT

ACZ ID: **L32236-01**

Date Sampled: 05/03/01 11:00

Date Received: 05/31/01

Sample Matrix: Soil

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Sieve- 250 um (60 mesh)	ASA No.9, 15-4.2.2	96.4		% Passing	0.1	0.5	06/06/01 9:00	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						06/05/01 10:15	bf

Mining Remedial Recovery Company

Project ID: USS LEAD

Sample ID: T1-2LT

ACZ ID: L32236-02

Date Sampled: 05/03/01 11:15

Date Received: 05/31/01

Sample Matrix: Soil

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Sieve- 250 um (60 mesh)	ASA No.9, 15-4.2.2	94.7		% Passing	0.1	0.5	06/06/01 9:15	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						06/05/01 10:17	bf

Mining Remedial Recovery Company

Project ID: USS LEAD

Sample ID: T1-3LT

ACZ ID: **L32236-03**

Date Sampled: 05/03/01 11:20

Date Received: 05/31/01

Sample Matrix: Soil

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Sieve- 250 um (60 mesh)	ASA No.9, 15-4.2.2	95.2		% Passing	0.1	0.5	06/06/01 9:30	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						06/05/01 10:20	bf

Mining Remedial Recovery Company

Project ID: USS LEAD

Sample ID: T2-1LT

ACZ ID: L32236-04

Date Sampled: 05/03/01 12:10

Date Received: 05/31/01

Sample Matrix: Soil

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Sieve- 250 um (60 mesh)	ASA No.9, 15-4.2.2	80.0		% Passing	0.1	0.5	06/06/01 9:45	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						06/05/01 10:23	bf

Mining Remedial Recovery Company

Project ID: USS LEAD

Sample ID: T2-2LT

ACZ ID: **L32236-05**

Date Sampled: 05/03/01 11:55

Date Received: 05/31/01

Sample Matrix: Soil

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Sieve- 250 um (60 mesh)	ASA No.9, 15-4.2.2	79.5		% Passing	0.1	0.5	06/06/01 10:00	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						06/05/01 10:26	bf

Mining Remedial Recovery Company

Project ID: USS LEAD

Sample ID: T2-3LT

ACZ ID: L32236-06

Date Sampled: 05/03/01 11:35

Date Received: 05/31/01

Sample Matrix: Soil

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Sieve- 250 um (60 mesh)	ASA No.9, 15-4.2.2	66.7		% Passing	0.1	0.5	06/06/01 10:15	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						06/05/01 10:29	bf

Mining Remedial Recovery Company

Project ID: USS LEAD
Sample ID: T2-5LT

ACZ ID: **L32236-07**
Date Sampled: 05/03/01 12:15
Date Received: 05/31/01
Sample Matrix: Soil

Soil Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Sieve- 250 um (60 mesh)	ASA No.9, 15-4.2.2	78.5		% Passing	0.1	0.5	06/06/01 10:30	lb

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						06/05/01 10:31	bf

Report Header Explanations

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LFM</i>	Laboratory Fortified Matrix
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBS</i>	Prep Blank - Soil
<i>LFB</i>	Laboratory Fortified Blank	<i>PBW</i>	Prep Blank - Water

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.

ACZ Qualifiers (Qual)

<i>B</i>	Analyte concentration detected at a value between MDL and PQL
<i>R</i>	Poor spike recovery accepted because the other spike in the set fell within the given limits.
<i>T</i>	High Relative Percent Difference (RPD) accepted because sample concentrations are less than 10x the MDL.
<i>U</i>	Analyte was analyzed for but not detected at the indicated MDL
<i>V</i>	High blank data accepted because sample concentration is 10 times higher than blank concentration
<i>W</i>	Poor recovery for Silver quality control is accepted because Silver often precipitates with Chloride.
<i>X</i>	Quality control sample is out of control.
<i>Z</i>	Poor spike recovery is accepted because sample concentration is four times greater than spike concentration.

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update II, September 1994.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

